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ADDITIONAL SOFTWARE FOR THE MATHEMATICA SYSTEM

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Additional software for the Mathematica system is represented.

Keywords: computer mathematics systems, Mathematica, Maple, programming, packages.

Systems of computer mathematics find more and more broad application in a number of natural, economical and social fields. These systems are important enough tools for researchers, scientists, engineers, teachers, and engineers, well enough combining symbolical methods with advanced computing methods. One of leaders in this software class is undoubtedly Mathematica. This work focuses on such important aspect as programming supported by the Mathematica. The given aspect is of particular importance not only for appendices but also above all it is important enough in the creation of the user tools that expand the most frequently used standard tools of the system and/or eliminate its shortcomings, or complement the new facilities.

The presented software contains a number of useful and effective receptions of procedural and functional programming in the Mathematica system which extend the system software and allow sometimes much more efficiently and easily to program the program objects for different purposes first of all wearing system character. Among them there are means which are of interest from the point of view of including of their or their analogs into standard means of Mathematica, at the same time they use approaches, useful in programming of applications in the Mathematica. The above software essentially dilates the Mathematica functionality and can be useful enough for programming of many problems above all of system character. These tools are designed as a MathToolBox package containing more 870 tools of various purpose with freeware license. This software eliminates restrictions of a number of the standard functions of Mathematica system, and expands its software with new tools. In this context, the given package can serve as a certain additional facility of programming, especially useful in the numerous applications when certain nonstandard evaluations have to accompany programming. At that, tools presented in the given package have direct relationship to certain principal questions of procedure and functional programming in the Mathematica system, not only for the decision of applied problems, but, first of all, for creation of software extending the most frequently used facilities of the system and/or eliminating their defects or extending the system with new facilities. The software represented in this package contains a number of useful enough and effective receptions of programming in the Mathematica system, and extends its software which allows to program the problems of various purpose more simply and more effectively.

The procedures and functions represented in this work not only are rather useful as certain additional resources expanding standard software and eliminating some of its de-

fects but also in the context of a certain handbook concerning both the standard, and the non–standard receptions (but equally valid ones) of programming in the Mathematica system that allow to program more effectively. The undoubted advantage of the above receptions is the fact that all they are founded on the standard tools of the core built–in Mathematica system language, determining their rather essential prolongation level. Thus, the additional facilities composing the MathToolBox package embrace the following sections of the Mathematica system, namely:

additional tools in interactive mode of the Mathematica system
additional tools of processing of expressions in the Mathematica system
additional tools of processing of symbols and strings in the Mathematica system
additional tools of processing of sequences and lists in the Mathematica system
additional tools extending the standard Mathematica functions or its software as a whole (control structures branching and cycle, etc.)
definition of procedures in the Mathematica software
definition of the user functions and pure functions in the Mathematica software
tools of testing of procedures and functions in the Mathematica software
headings of procedures and functions in the Mathematica software
formal arguments of procedures and functions in the Mathematica software
local variables of modules and blocks; tools of their processing
global variables of modules and blocks; tools of their processing
attributes, options and values by default for arguments of the user blocks, functions and modules; additional tools of their processing in the Mathematica software
some useful additional tools for processing of blocks, functions and modules
additional tools of the processing of internal Mathematica datafiles
additional tools of the processing of external Mathematica datafiles
additional tools of the processing of attributes of directories and datafiles
additional and some special tools of processing of datafiles and directories
additional tools of operating with packages and contexts ascribed to them
a set of procedures for computer research of one–dimensional cellular automata in the Mathematica system and simplification of programming of tools for solution of various problems in this field.

All tools of the package are provided with usages, whereas the detailed descriptions of the tools along with typical examples and features of their use can be found in our books [1-3]. The given package, is mostly for people who want the more deep understanding in the Mathematica programming, and particularly those the Mathematica users who would like to make a transition from the user to the programmer, or perhaps those who already have some limited experience in the Mathematica programming but want to improve their possibilities in the system. The expert Mathematica programmers will probably find useful enough information too. The given package is available in the form of an archive containing 5 files of formats cdf, pdf, m, mx, nb, allowing to use the package on all operating platforms supported by the Mathematica system. The archive is supplied by freeware license and can be freely downloaded from address: https://yadi.sk/d/sVfAaJPyvLG4V or https://yadi.sk/d/uAF7efoyvLG8s.

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